The Patent Office
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Cardiff Road
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South Wales
NP10 8QQ

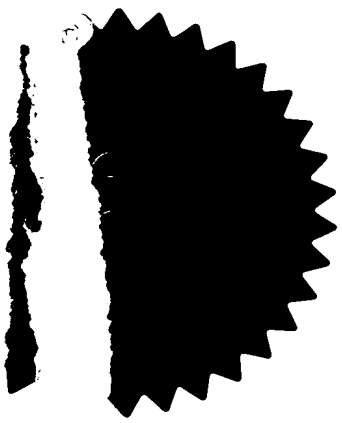
I, the undersigned, being an officer duly authorised in accordance with Section 74(1) and (4) of the Deregulation & Contracting Out Act 1994, to sign and issue certificates on behalf of the Comptroller-General, hereby certify that annexed hereto is a true copy of the documents as originally filed in connection with the patent application identified therein.

I also certify that the attached copy of the request for grant of a Patent (Form 1/77) bears a correction, effected by this office, following a request by the applicant and agreed to by the Comptroller-General.

In accordance with the Patents (Companies Re-registration) Rules 1982, if a company named in this certificate and any accompanying documents has re-registered under the Companies Act 1980 with the same name as that with which it was registered immediately before re-registration save for the substitution as, or inclusion as, the last part of the name of the words "public limited company" or their equivalents in Welsh, references to the name of the company in this certificate and any accompanying documents shall be treated as references to the name with which it is so re-registered.

In accordance with the rules, the words "public limited company" may be replaced by p.l.c., plc, P.L.C. or PLC.

Re-registration under the Companies Act does not constitute a new legal entity but merely subjects the company to certain additional company law rules.

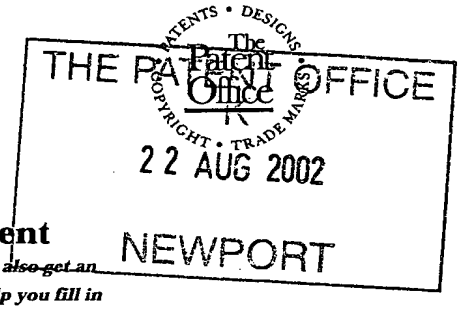


Signed

Dated 1 August 2003

Patents Form 1/77

Patents Act 1977
(Rule 16)



1/77

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P01/7700 0.00-0219552.7

Request for grant of a patent

(See the notes on the back of this form. You can ~~also~~ get an explanatory leaflet from the Patent Office to help you fill in this form)

The Patent Office

Cardiff Road
Newport
South Wales
NP10 8QQ

1. Your reference — A10206GB-WL/AAL

2. Patent application number *(The Patent Office will fill in this part)* — 0219552.7 — 22 AUG 2002

3. Full name, address and postcode of the or of each applicant *(underline all surnames)*

Richard ~~Gately~~ Gatley.
The Bruff Business Centre
Bushbank
Suckley
Worcestershire, WR6 5DR

Patents ADP number *(if you know it)* 8447974600 1

If the applicant is a corporate body, give the country/state of its incorporation — United Kingdom

4. Title of the invention — Air Pressure Stabilisers

5. Name of your agent *(if you have one)* — Forrester Ketley & Co.

"Address for service" in the United Kingdom to which all correspondence should be sent *(including the postcode)*

Chamberlain House
Paradise Place
Birmingham
B3 3HP

Patents ADP number *(if you know it)* — 133005

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and *(if you know it)* the or each application number

Country	Priority application number *(if you know it)*	Date of filing *(day / month / year)*

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application	Date of filing *(day / month / year)*

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? *(Answer 'Yes' if:*

a) any applicant named in part 3 is not an inventor, or
b) there is an inventor who is not named as an applicant, or
c) any named applicant is a corporate body.
See note (d))

NO

Patents Form 1/77

9. Enter the number of sheets for any of the following items you are filing with this form. Do not count copies of the same document

Continuation sheets of this form	✓
Description	5
Claim *(s)*	2 ✓
Abstract	1
Drawing *(s)*	1 + 1 RW

10. If you are also filing any of the following, state how many against each item.

Priority documents	-
Translations of priority documents	-
Statement of inventorship and right to grant of a patent *(Patents Form 7/77)*	-
Request for preliminary examination and search *(Patents Form 9/77)*	-
Request for substantive examination *(Patents Form 10/77)*	-
Any other documents *(please specify)*	-

11. I/We request the grant of a patent on the basis of this application.

Signature for Forrester Ketley & Co. Date 21 August 2002

12. Name and daytime telephone number of person to contact in the United Kingdom

William Lally
0121 236 0484

Warning

After an application for a patent has been filed, the Comptroller of the Patent Office will consider whether publication or communication of the invention should be prohibited or restricted under Section 22 of the Patents Act 1977. You will be informed if it is necessary to prohibit or restrict your invention in this way. Furthermore, if you live in the United Kingdom, Section 23 of the Patents Act 1977 stops you from applying for a patent abroad without first getting written permission from the Patent Office unless an application has been filed at least 6 weeks beforehand in the United Kingdom for a patent for the same invention and either no direction prohibiting publication or communication has been given, or any such direction has been revoked.

Notes

a) *If you need help to fill in this form or you have any questions, please contact the Patent Office on 08459 500505.*

b) *Write your answers in capital letters using black ink or you may type them.*

c) *If there is not enough space for all the relevant details on any part of this form, please continue on a separate sheet of paper and write "see continuation sheet" in the relevant part(s). Any continuation sheet should be attached to this form.*

d) *If you have answered 'Yes' Patents Form 7/77 will need to be filed.*

e) *Once you have filled in the form you must remember to sign and date it.*

f) *For details of the fee and ways to pay please contact the Patent Office.*

PATENTS ACT 1977

A10206GB

Title: Air Pressure Stabilisers

Description of Invention

This invention relates to air pressure stabilisers.

Conventionally it is the practice in a surgically clean environment to maintain an environmental pressure slightly above atmospheric pressure, to prevent possibly contaminated air from flowing into the environment, such as through gaps in doors, windows and the like. An air pressure stabilising device is conventionally used to control this pressure, which comprises a duct defining an opening, and a control member mounted in the opening for movement between open and closed positions, the control member being operative to move from its closed position in the event that pressure in the area under control rises above a predetermined level above atmospheric pressure, and to return to its closed position in the event that pressure falls below said predetermined level.

In this way, pressure within the area under control may be retained at a desired level above atmospheric pressure.

The conventional air pressure stabiliser is a purely mechanical device comprising a control member in the form of a generally flat plate which is mounted for pivotal movement about a horizontal axis. The stabiliser is conventionally adjusted when it is initially installed by moving the centre of gravity of the control member in relation to the horizontal axis by mechanical counter balances to alter the pressure at which the control member moves and the extent to which it opens.

This system has a number of shortcomings. The control member rotates on bearings and the friction in these bearings must be overcome in order for the control member to move. Thus the air pressure stabiliser may be difficult to control at low air flows, and this instability can lead to hunting of the air control

system. Thus, traditionally, it has been necessary to closely match the size and rated capacity of the air pressure stabiliser to the likely level of air flow.

In addition the mechanical balancing system of an air pressure stabiliser only works effectively up to an angle of rotation of the control member of about 48°. The effective area of the duct is thus limited to around 36% of the total area. Thus a relatively large air pressure stabiliser must usually be provided which results in an inefficient use of wall space.

According to this invention there is provided an air pressure stabiliser comprising: a pivot mechanism for mounting across an opening, to provide a pivot axis extending across the opening; and a control member arranged to be mounted on the pivot mechanism thereby to be rotatable about the pivot axis for movement between a closed position in which it substantially closes the opening and an open position; characterised in that the stabiliser further comprises: a pressure sensor arranged to sense the pressure on one side of the opening; drive means which is arranged in use to engage with the pivot mechanism; and a controller, which in use activates the drive means depending on the pressure sensed.

Thus this invention allows the control member to be quickly and efficiently driven to a desired position.

Preferably the controller activates the drive means to move the control member only to its open position or to its closed position, and not to positions therebetween. This prevents the control member becoming unstable and "hunting" at low pressure differences.

The control member may be driveable through more than 60° of rotation, and preferably is driveable through substantially 90° of rotation. This means that the effective area of the control member is substantially equivalent to its total area, resulting in an efficient use of space.

Preferably the pressure sensed is the differential pressure between opposite sides of the opening. The controller may control the motor using only this pressure value, but preferably the controller is capable of evaluating a pressure-time relationship and reacting to one or more characteristics of the pressure-time relationship. Any convenient characteristic could be used for control, a preferred example being the rate of change of pressure with time.

The controller may further comprise a data output display and a data input device. This enables convenient manual control of the controller, giving an easy way to set the operating parameters and choose the control characteristics.

Preferably the controller further comprises an alarm, responsive to the pressure sensed. This allows the user to be warned if necessary, for example if the pressure in the room exceeds a predefined level for a certain period of time.

Advantageously a plurality of the air pressure stabilisers described above are linked to a central controller. This may be a dedicated controller or a general purpose computer. If many air pressure stabilisers are being controlled this provides a convenient way to co-ordinate their control and operation.

A preferred embodiment of the invention, selected by way of example, will now be described, with reference to the following drawing in which:

FIGURE 1 shows schematically an overview of the system in use.

An air pressure stabiliser 10 is mounted in a duct 12 between a first room 14 which has a surgically clean environment and a second room 16 which is open to atmosphere. The first room 14 is maintained at above atmospheric pressure through control of the flow of air through an air inlet 18 and an air outlet 20 in the room.

The air pressure stabiliser has a control member 22, which is pivotally mounted in the duct on a pivot mechanism 24. A motor 26 is connected to the pivot mechanism to rotatably drive the mechanism and thus rotate the control member 22. A controller 28 receives data from pressure sensors 30, 32, which

are mounted respectively in the first room 14 and the second room 16. The controller 28 is connected to the motor 26 and able to start and stop it. It has a display 34 for data output, a keypad 36 for data input and an audio and visual alarm 38. The controller 28 may be connected to a number of air pressure stabilisers, and to a central computer (not shown).

The controller 28 activates the motor 26 to open and close the control member 22 in order to balance the differential pressure between the first room 14 and the second room 16. It may work simply by using the level of differential pressure, or by using more complex criteria. In the former case, if the pressure in the first room 14 drops to below the desired pressure the controller 28 will activate the motor 26 to close the control member 22.

In the latter case the controller 28 may be capable of monitoring the differential pressure signal over time to derive a pressure time relationship. It can then evaluate this relationship. For example, the controller 28 could be programmed to recognise that a fast fall in the pressure-time graph means that a door in the first room has been opened, and the control member 22 should be shut immediately.

In either case the controller 28 responds to changes in pressure by causing the control member 22 to be moved so that it is either fully open or fully closed. This prevents the air pressure stabiliser from hunting and becoming unstable. Since the control member 22 is driven it can be moved through 90° of rotation, this increase in effective area meaning that it requires less total area than a non-driven air pressure stabiliser to provide the same response.

In the present specification "comprises" means "includes or consists of" and "comprising" means "including or consisting of".

The features disclosed in the foregoing description, or the following claims, or the accompanying drawings, expressed in their specific forms or in terms of a means for performing the disclosed function, or a method or process

for attaining the disclosed result, as appropriate, may, separately, or in any combination of such features, be utilised for realising the invention in diverse forms thereof.

CLAIMS

1. An air pressure stabiliser comprising:

a) a pivot mechanism for mounting across an opening, to provide a pivot axis extending across the opening; and

b) a control member arranged to be mounted on the pivot mechanism thereby to be rotatable about the pivot axis for movement between a closed position in which it substantially closes the opening and an open position;

characterised in that the stabiliser further comprises:

(i) a pressure sensor arranged to sense the pressure on one side of the opening;

(ii) drive means which is arranged in use to engage with the pivot mechanism; and

(iii) a controller, which in use activates the drive means depending on the pressure sensed.

2. An air pressure stabiliser according to Claim 1 characterised in that the controller activates the drive means to move the control member only to its open position or to its closed position, and not to positions therebetween.

3. An air pressure stabiliser according to Claim 1 or Claim 2 characterised in that the control member is driveable through more than 60° of rotation.

4. An air pressure stabiliser according to Claim 3 characterised in that the control member is driveable through substantially 90° of rotation.

5. An air pressure stabiliser according to any preceding claim characterised in that the pressure sensed is the differential pressure between opposite sides of the opening.

6. An air pressure stabiliser according to any preceding claim characterised in that the controller is capable of evaluating a pressure-time relationship and reacting to one or more characteristics of the pressure-time relationship.

7. An air pressure stabiliser according to Claim 6 characterised in that one of the characteristics is the rate of change of pressure with time.

8. An air pressure stabiliser according to any preceding claim characterised in that the controller further comprises a data output display and a data input device.

9. An air pressure stabiliser according to any preceding claim characterised in that the controller further comprises an alarm, responsive to the pressure sensed.

10. A plurality of air pressure stabilisers according to any preceding claim linked to a central controller.

11. An air pressure stabiliser constructed and arranged substantially as hereinbefore described with reference to the accompany drawings.

12. Any novel feature or novel combination of features hereinbefore described and/or shown in the accompanying drawings.

ABSTRACT

Title: Air Pressure Stabilisers

An air pressure stabiliser is described which comprises:

(a) a pivot mechanism for mounting across an opening, to provide a pivot access extending across the opening, and

b) a control member arranged to be mounted on the pivot mechanism thereby to be rotatable about the pivot axis for movement between a closed position in which it substantially closes the opening and an open position;

characterised in that the stabiliser further comprises:

(i) a pressure sensor arranged to sense the pressure on one side of the opening;

(ii) drive means which is arranged in use to engage with the pivot mechanism; and

(iii) a controller, which in use activates the drive means depending on the pressure sensed.

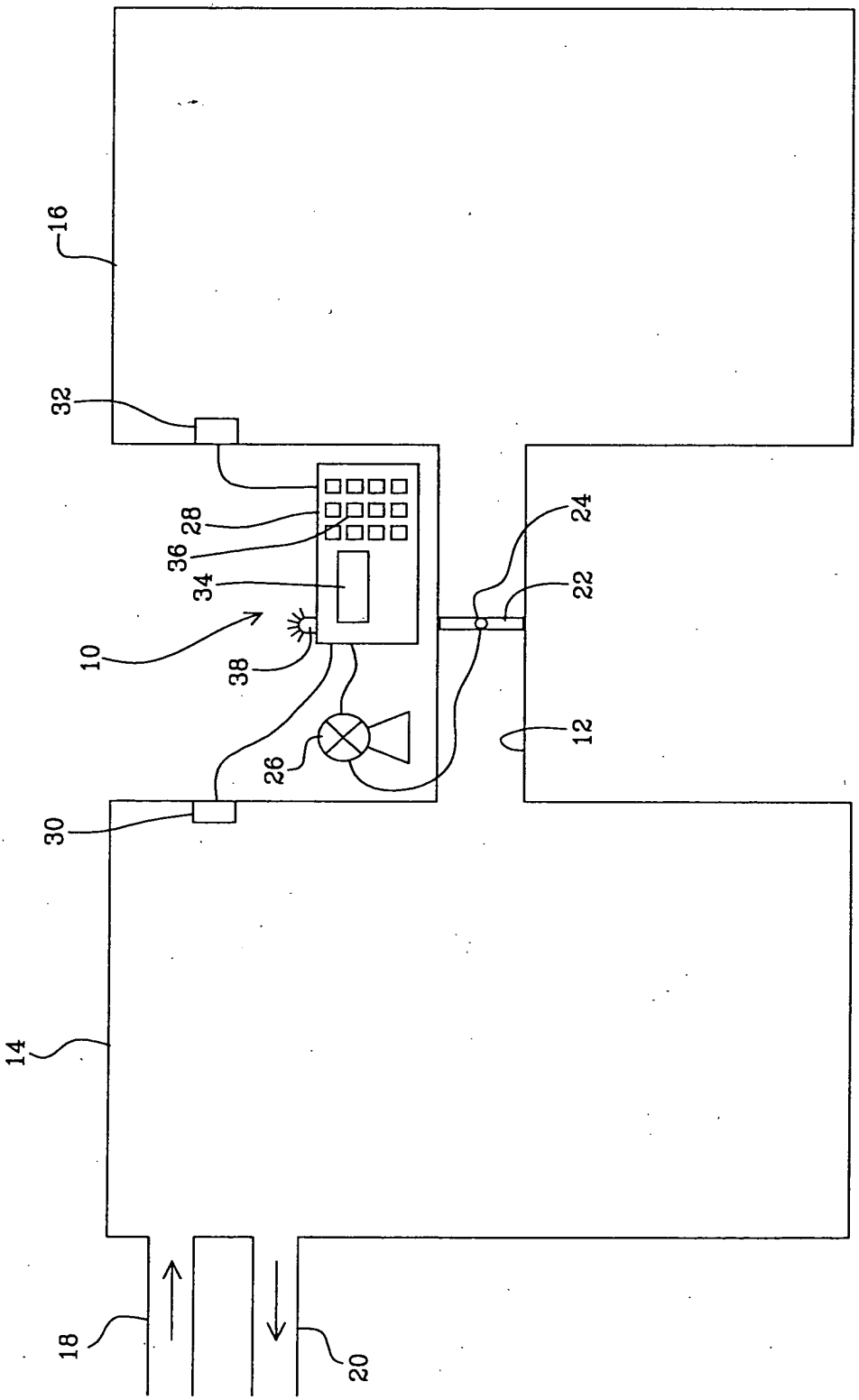

FIG. 1

A10206GB